



## **OUTBREAK SPOTLIGHT....**

*“Outbreak Spotlight” is a regularly appearing feature in the Indiana Epidemiology Newsletter. The event described below highlights the importance of contact tracing and exclusion policies for cases of illness in institutional-type settings.*

### **What a Tangled Web *Shigella* Weaves... Outbreak of Shigellosis at a Daycare Center**

#### ***Background***

On November 30, 2001 a representative of a local health department (LHD) notified the Indiana State Department of Health (ISDH) of a possible shigellosis outbreak involving a local church and daycare center. The daycare center includes approximately 70 children and 12 staff. Due to the infectious nature of shigellosis and the young population of the daycare center, there was a high potential for transmission of infection.

#### ***Epidemiologic Investigation***

The LHD and the ISDH conducted a collaborative investigation of this outbreak. As of November 30, the LHD had identified one positive adult church member. This case, whose onset was November 12, had two children and another family member pending testing. The children did not attend the daycare center. However, the LHD contacted the daycare director to inquire about possible cases due to the vulnerability of the daycare population. The daycare director reported that approximately twelve children in the toddler room had been ill with diarrhea within the last six weeks. The cause of the children's illness was never determined, and they were asymptomatic by this time. No staff members had been reported ill. Although the children are separated into different rooms according to age, they do use common restrooms. Training of staff regarding hand washing and environmental decontamination had already been performed. A letter describing the situation and pertinent exclusion policies was sent to all parents of daycare children on November 28. The Indiana Communicable Disease Rule, IAC 410 1-2.3, mandates that symptomatic children be to be excluded from daycare until they are asymptomatic and have completed five days of antibiotic therapy or have submitted two negative stool specimens. Asymptomatic children pending stool culture results or completing antibiotic therapy may be cohorted separately from other children.

To identify children who may have been asymptomatically shedding, ISDH recommended that all children and staff members submit stool specimens for testing (see “Laboratory Results”). The LHD distributed specimen collection containers to the daycare center, and the daycare director distributed specimen containers and verbally informed parents as they came to the daycare. The LHD transported specimens for testing at the ISDH Laboratories. Some children were also tested through private health care providers. Information regarding the possible outbreak was given during church services on

December 2. On December 3, letters were issued to parents of all children ages six years and younger who attend the church.

By December 7, five children had tested positive for *Shigella*. Four of these children attended the daycare, and all were excluded. Three of the children also attended kindergarten at a nearby elementary School. The LHD issued letters were issued to parents of kindergartners and first graders at the school. The LHD also completed case investigation reports on all diagnosed cases and forwarded copies to ISDH. Case information was entered into an ISDH database to track demographic information, possible links between cases, and onset dates. At this time, one family whose children attend the daycare reported having symptoms compatible with shigellosis starting September 29. The family members were not diagnosed at that time; however, the daycare children were tested as part of the investigation.

By December 11, three more children had tested positive for *Shigella*. All attended the daycare, and one attended kindergarten at the school. The ISDH issued a letter describing the outbreak to local health care providers and surrounding local health departments. Letters had also been previously distributed to local health care providers by the LHD. On December 12, another child who attended the daycare and a local preschool was confirmed positive. The LHD issued letters to parents of the preschoolers, as well as parents of students attending the preschool, where three students with compatible symptoms had been identified and were pending results.

By December 19, eighteen cases had been confirmed, including one part-time volunteer at the daycare center. Since this case also served as a tutor in a high school special education class, the LHD issued letters to all tutors as well as parents of students in the classroom and the school nurse. As of January 2, 2002, 22 cases had been identified. By January 17, 24 cases had been confirmed positive, all with onset dates prior to January 1. No cases were identified after January 1. Active surveillance was conducted until January 22, one month since the last known onset date of December 18. At that time, the outbreak was declared over.

### ***Environmental Assessment***

Representatives from the LHD discussed infection control measures with the daycare director when the outbreak was first suspected and observed daycare practices during several visits. Two full-time food service staff members are the only employees who prepare food. Neither of these staff members were reported ill, and both tested negative for *Shigella*. Children and staff are not permitted to bring off-site food or beverages into the daycare center. One part-time volunteer became ill on December 10. Children and the volunteer who were symptomatic or who tested positive were excluded according the aforementioned exclusion policies.

No wading pools are used at the daycare site. Daycare centers licensed in the state of Indiana are not permitted to use wading pools. To rule out the possibility of water contamination at the daycare, the LHD collected a drinking water sample on December 11 (see “Laboratory Results”) for testing at the ISDH Laboratories.

## ***Laboratory Results***

Approximately 85 stool specimens were submitted to the ISDH Laboratories for analysis. Additional specimens were submitted to private laboratories for testing. All children and staff at the daycare were tested, as well as symptomatic cases in preschools, schools, and contacts of cases. A total of 24 cases tested positive for *Shigella sonnei*. This particular strain was resistant to ampicillin and sensitive to sulfa antimicrobials.

A drinking water sample was collected from the daycare and submitted to the ISDH Laboratories for analysis. This sample tested negative for total coliforms and *E. coli*, an indicator of fecal contamination.

## ***Conclusions***

This investigation confirms an outbreak of shigellosis occurred in an Indiana county during November and December 2001. Twenty-four cases were identified during this time period, compared with no cases identified in this county during 2000 or 1999. The causative agent of this outbreak was *Shigella sonnei*. Sixteen of the 24 cases attended one daycare center, eight attended a nearby elementary school, three attended a local preschool, one attended a local high school, and two cases were household contacts.

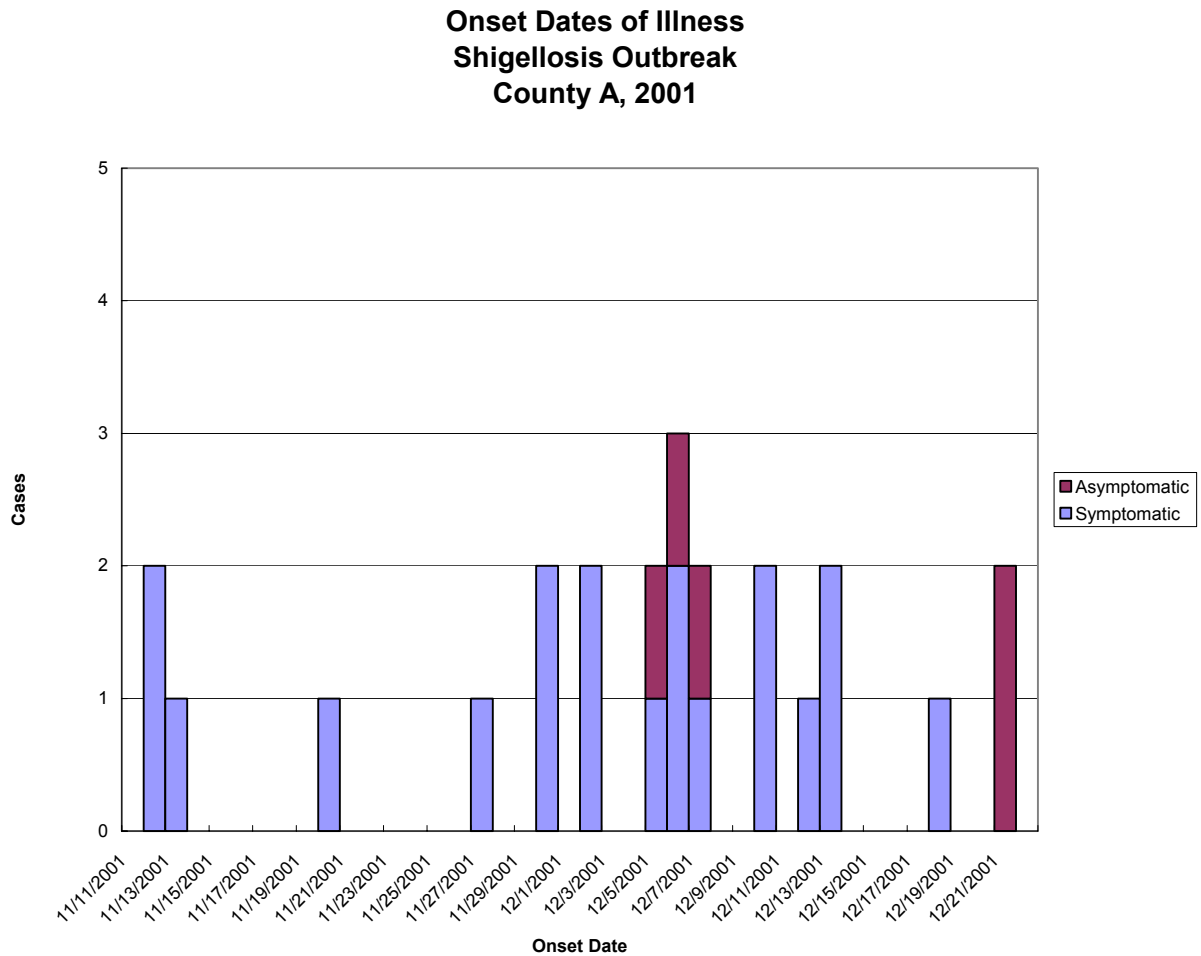
*Shigella* bacteria are found only in humans and are shed through stool. Symptoms of shigellosis include abdominal cramps, diarrhea (usually containing blood or mucus), nausea, vomiting, and fever. The outbreak strain of *Shigella* resembles the strain circulating in Indiana during the last two years, which produces watery diarrhea (rather than bloody or mucus-containing) and little or no fever. This particular strain is also resistant to ampicillin but generally sensitive to sulfa antimicrobials. Without appropriate antibiotic treatment, those infected can shed the bacteria as long as one month.

Transmission occurs through direct or indirect fecal/oral contact, with ingestion of as few as 10-100 organisms. Bacteria can be transmitted through contaminated food or water or person-to-person contact. Foodborne shigellosis outbreaks usually occur when an infected food handler with inadequately washed hands prepares food that is served raw (i.e., salads, vegetables, etc.) or that is handled extensively after cooking (i.e., sliced sandwich meats, rolls, etc.). Fecally-contaminated water can also transmit infection. Person-to-person can occur through direct physical contact or placing contaminated objects in the mouth.

The route of transmission in this outbreak was person-to-person rather than foodborne or waterborne. The two food workers at the daycare were asymptomatic and tested negative for *Shigella*. These are the only staff members who prepare food. Children are not permitted to bring any food or beverages into the center from off-site. Water samples from the daycare tested negative for total coliforms and *E. coli*, an indicator of fecal contamination.

Infection may have been introduced through an ill child who attended the daycare (see Figure 1). Infection can quickly spread, especially in the absence of adequate hygiene, due to the infectious nature of *Shigella* and the close personal contact within the population. The daycare director reported children being ill with diarrhea six weeks prior to the outbreak. These children were not diagnosed or treated. One family with children in the daycare was identified as having compatible symptoms as early as September 29. These children tested negative; however, over six weeks had elapsed since these children had been ill. If these children had shigellosis, shedding would likely have ceased by that time even in the absence of treatment.

**Figure 1.**



**Note: Dates of asymptomatic cases reflect the date the first positive culture was identified.**

In addition to enforcing the Indiana Communicable Disease Reporting Rule regarding exclusion, several other measures were promptly taken to control the spread of the outbreak. First, recommendations for prevention, including exclusion policies, and hand washing guidelines, were provided to the daycare director by the LHD. Training for proper hand washing and environmental decontamination had already been performed at the daycare center. A letter describing the situation was sent to all parents of children enrolled in the daycare. When additional cases were identified, testing of all daycare children and staff was initiated to identify asymptomatic carriers. Children and staff who developed symptoms or tested positive were immediately excluded. One staff member did become ill, but given that the onset date occurred after the outbreak had begun, this person was part of the outbreak rather than the cause. Additional letters were sent to school parents and health care providers as the investigation progressed. Once introduced into a vulnerable population, shigellosis can be difficult to control even with the most stringent measures, due to its highly infectious nature.

In general, most person-to-person outbreaks of shigellosis can be prevented by strictly adhering to the following practices:

1. Thoroughly wash hands with soap and water before preparing food, after using the restroom, after diapering children, and before eating.
  2. Thoroughly wash hands with soap and water after assisting someone using the restroom or caring for people ill with diarrhea and vomiting.
  3. Supervise young children when they are washing their hands.
  4. Exclude food handlers or staff having direct care of children from working while ill with diarrhea and/or vomiting until symptoms have ceased.
  5. Exclude children from attending daycare while ill with diarrhea or if they are infected with *Shigella*.
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